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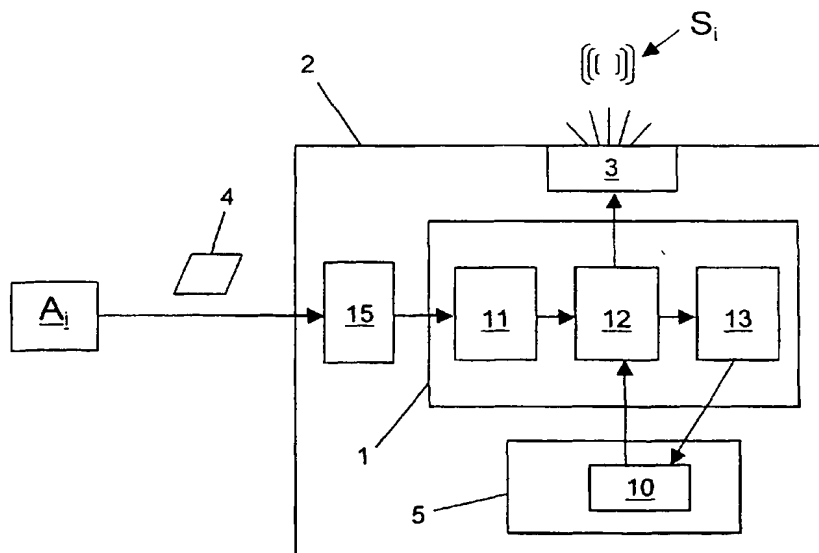
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[Continued on next page]

(54) Title: DEVICE FOR SELECTING RING TONES IN REAL TIME ACCORDING TO THE CALLER'S NUMBER AND ASSOCIATED METHODS AND SYSTEMS



(57) Abstract: The present invention relates to devices and methods for selecting ring tones in real time and for matching available ring tones with values associated with a caller's number. The selection device (1) comprises means (11) for identifying a caller's number (4) and means (12) for selecting a ring tone (S_i) to be sounded from available ring tones. These selection means select the ring tone to be sounded according to the value of a restricted part of the caller's number, preferably representative of an area and/or a network from which the call comes. They comprise a module for selecting, according this value, a family of ring tones and a module for internally selecting the ring tone to be sounded from within the selected family, independently of the caller's number.



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**Device for selecting ring tones in real time according to the caller's
number and associated methods and system**

5 The present invention relates to a device and to a method for
selecting ring tones in real time according to a caller's number, in particular
in the field of telephones. It also relates to a device and to a method for
matching available ring tones with values associated with a caller's number,
able to be used for selecting ring tones in real time. The invention also
applies to associated applications and to an associated software product.

10

It is known to be able to identify, on one's telephone, the person
calling by an automatic display of his telephone number. Existing systems
allow direct display of the names of callers by pre-associating the numbers
with names in the telephone. However, these systems require the user to be
15 in the immediate vicinity of the telephone in order to examine the number,
and they are not suitable for the blind or for the partially sighted. In addition,
although in general subscribers are able to immediately identify the most
frequent callers simply by seeing their number, the same does not usually
apply with more occasional callers.

20

To improve the recognition of callers, several techniques have
been proposed for sounding distinct telephone ring tones according to
callers. These techniques rely on the user associating beforehand selected
ring tones with predefined respective numbers. Thus, when the caller's
25 number is recognized in a list of these numbers, the corresponding ring tone
is automatically sounded. Otherwise, a default ring tone is selected. The
caller can therefore be identified remotely - he may even be recognized by
the partially sighted and the user's memory capability is greater than when
simply numbers are displayed.

30

Thus, document GB-2 308 038 describes a telephone set containing a memory for storing recordings containing names and associated telephone numbers. When an incoming call has an identified source recognized as corresponding to one of the telephone numbers stored, the
5 ring tone is consequently matched.

Document WO 00/17850 discloses the application of an automatic music generator for controlling a musical call ring tone personalized by the user, the musical ring tone being, as a variant, automatically associated with the telephone number of the caller (page 26, lines 14-18).
10

However, such systems allow only a very limited number of callers to be taken into account, not only for reasons of memory size in the telephone, but also because the user is generally unable to remember the matching of a very large number of ring tones with predefined callers.
15

Document EP 0 901 263 provides a method of handling telephone numbers in a mobile telephone, comprising the definition of groups of callers in the form of lists of numbers. To each group is assigned a distinct ring tone, which is selected on receiving a call. When a number is recognized as not
20 being in the groups, a default ring tone is sounded. This method does allow a large number of possible callers to be taken into account by making a distinction between, for example, home numbers, office numbers and client numbers. However, this method requires all of the numbers in question to be predefined and therefore requires regular monitoring in order to update them,
25 for example in order to incorporate new numbers of work colleagues or of clients. In addition, all callers not prerecorded produce the same ring tone.

Publication EP 0 822 697 discloses a method for discriminating callers in a telephone system. This system is provided with a memory
30 intended to contain a password. When a person enters this password when calling the user, he receives a special treatment, in particular by the

sounding of a ring tone distinct from that used when the password is not entered. This method allows the user to immediately identify the members of the group having the password, without it being necessary to prerecord their names and telephone numbers. Thus, the members of the group may
5 change or use telephone sets other than those normally used, without the possibility of recognition being impaired thereby.

However, such a system constrains the callers to a specific procedure, which if it is not carried out no discrimination is provided. In addition, distinguishing callers by means of ring tones amounts to a binary
10 recognition between the members of the group and the others. In practice, as suggested in the document, the members of the group are reduced to a few close persons, no information by the ring tone being given about the other callers.

15 A highly advantageous solution is mentioned by Ericsson in the disclosure RD-439036 in the journal *Research Disclosure* published on November 10, 2000. It consists in identifying the geographical area from which the caller comes by the telephone number and in making a different ring tone, predetermined for each pre-identified area, ring. The ring tones,
20 which consist of national anthems for countries and of traditional themes for regions of one's own country, may be downloaded from a library available on the Internet.

This method offers very promising prospects and partly solves the
25 abovementioned problems. However, it has the drawback of fixing the selection of ring tones according to the predefined areas and musical phrases. A user might, to be sure, envisage the possibility of modifying his tunes by downloading new ring tones, or even of himself redefining the intended geographical areas. However, such modifications require a number
30 of specific operations on the part of the user each time. Once these operations have been performed, the ring tone corresponding to each

country or to each region is invariably the same. No finer distinction according to calls is therefore possible.

5 The present invention relates to a device for selecting ring tones in real time, making it possible to discriminate the callers without it being necessary to prerecord the numbers of all the persons in question and without the callers having to carry out specific recognition operations.

10 The selection device of the invention makes dynamic identification possible, that is to say it allows modifications over time to the numbers concerned by the discriminating ring tones and a very large number of callers may be envisaged. In addition, it is reconcilable with easy storing by the user of associations between ring tones and callers. What is more, it permits greater diversity and finer discrimination than with the method of associating countries or regions with national anthems or traditional tunes respectively.

15

The invention also relates to a method for selecting ring tones in real time, having the aforementioned advantages.

20 The invention also relates to devices, software and methods making it possible for the ring tone selection method of the invention to be implemented or the ring tone selection device of the invention to be employed.

25 It applies in particular to the field of telephony, both fixed and mobile, but it also has applications in the information technology field, all ring tones possibly being sounded in terminals.

30 For this purpose, the subject of the invention is a device for selecting ring tones, preferably telephone ring tones, in real time, comprising:

- means for identifying a caller's number, and

- means for selecting a ring tone to be sounded from at least two available ring tones, which means are capable of selecting the ring tone to be sounded according to the value of a restricted part of the caller's number, defining a set of callers.

5

These selection means comprise:

- a module for selecting, according to said value of the restricted part, a family of ring tones from at least two families of ring tones available, at least one of said families comprising at least two ring tones,

10

- and an internal module for selecting the ring tone to be sounded from within the family selected.

According to the invention, the internal selection module is capable of selecting the ring tone to be sounded from the selected family independently of the caller's number.

15

The expression "restricted part of the caller's number" is understood to mean a distinct part of the complete number, relating for example only to the first digits of the number (preferred embodiments) or to the sum of the digits of the number (this is then a "part" of the number in the sense of an incomplete information item about the latter). For convenience, the term "caller's number" is used in the singular, while mentioning the "values" of this number. Given that the number of digits in the caller's number may vary, the restricted part is defined on the basis of the combination of the various cases envisaged (for example, the restricted part comprises: the first six digits for a ten-digit number and the third to the ninth digits for a number containing more than ten digits, even if in most anticipated cases only two of these digits are used to determine the ring tone to be sounded).

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In addition, within this definition, as below, the entities are defined in functional terms and therefore may or may not be likened to physical units:

the various entities may be combined on an electronic card or in a software package, said entities being distributed respectively in distinct objects, or shared in the case of some of them in disjunct elements, etc.

5 In contrast with the Ericsson technique described in document RD-439036, a group of call sets defined by the restricted part of the caller's number (giving, for example, the country from which the call comes) is not associated with a single ring tone but with several (these not being determinable unequivocally by means of the caller's number). It is thus
10 possible to enter a diversity of ring tones for the same group, in order to define significant subgroups, to identify predetermined callers and/or for the pleasure of diversity. Moreover, some of these groups may be associated with a single ring tone, the corresponding family then comprising a single element.

15 Preferably, the musical ring tones of each of the families are consistent, so that it can be readily identified that they belong to the same family. For example, the group in question covers calls coming from the United States and the associated family of ring tones comprises a group of
20 musical ring tones of typically American style (country, jazz, etc.). A particular subfamily of ring tones is chosen for the subgroup of callers coming from the New York State, and even a subfamily of this subfamily for calls coming from a given company in this State (said company being identified by the first telephone digits of an internal network). Within this latter
25 subfamily, the ring tones are selected randomly according to the callers coming from the company, except for a few predetermined persons, the complete values of the telephone number of whom are associated with very precise ring tones.

30 Surprisingly, and contrary to the existing systems, the selection device of the invention therefore relies neither on unequivocal definitions of

values of the caller's number nor on unequivocal and predefined associations of ring tones with partial values of the caller's number. By contrast, the information used from the partial value of the caller's number defines groups of callers (each caller being associated with a complete value
5 of the caller's number) which related to families of ring tones.

On listening, the person called may thus immediately identify information about the caller, even if he does not know him and has never dealt with him (geographical origin of the call, company to which he belongs,
10 telecommunications network used, etc.). Furthermore, an additional discriminating capability is offered beyond this information. What is more, this recognition requires no procedure on the part of the callers and applies to a variable and unlimited number of persons in each of the groups. Another advantage of the invention is the diversity provided in the ring tones,
15 including in each group of callers.

The nature of the information obtained on listening and the choice of corresponding ring tones are established at the beginning, by the user, or an automatic system.

20

The number of groups is advantageously established by the user, according to his requirements, his wishes (as he may, for example, opt for a larger number of distinct musical ring tones to please his ear, even if he merely extracts useful information from only some of these ring tones) and/or
25 his memory capability. The groups defined may also have intersections. In this case, either priority orders are predefined or the choice between the ring tones is performed according to given criteria (for example, randomly), or specific ring tones are preferably provided for intersections between groups.

30 What is more, the device of the invention may also incorporate known systems for automatically recognizing the complete number of the

caller, specific ring tones being reserved for this. If the caller's number is not known, or is not identified as being associated with a particular ring tone, a default ring tone is sounded.

- 5 Preferably, the restricted part is representative of an area from which the call comes and/or of a network from which the call comes.

Thus, said restricted part is advantageously chosen from:

- 10 - an indicator representative of a communications network;
 - an indicator representative of a country;
 - an indicator representative of a national region and/or a city;
 - an indicator representative of a company network; and
 - a combination of at least two of these indicators.

- 15 In other less significant embodiments, and for pure amusement or esthetics, the restricted part consists of the last digit or digits of the caller's number or of the sum of the digits of this number.

- 20 In a first advantageous embodiment of the internal selection module, the latter is capable of selecting the ring tone to be sounded from the selected family in a random manner.

- 25 Within the family of ring tones, the ring tone sounded is therefore unpredictable for the person called, thereby allowing him to avoid routine.

- In a second advantageous embodiment, the internal selection module is capable of selecting the ring tone to be sounded from the selected family in a cyclic manner.

For each group of values of the caller's number, the ring tone sounded from the corresponding family is then predictable, but changes with the calls.

- 5 In a third advantageous embodiment, the internal selection module is capable of selecting the ring tone to be sounded from the selected family according to the time.

- 10 Thus, it is possible, for example, to choose different ring tones from the same family according to the time of day, or the day of the week.

- 15 In a fourth advantageous embodiment, the internal selection module is also capable of selecting the ring tone to be sounded from the selected family according to a partial complementary part of the restricted part of the caller's number.

- 20 The expression "partial complementary part of the restricted part" is understood to mean information complementary to the restricted part in the caller's number, said complementary information being insufficient, however, to allow this number to be completely generated. This fourth embodiment amounts to defining subfamilies of the family of ring tones in question, these being associated with subgroups of the group of values of the corresponding caller's number. This capability must be understood as being additional to another embodiment (for example, one of the three defined above), which for its part relies on a ring tone selection independent of the caller's number.

- 30 Advantageously, the selection means comprise an association module for associating, in respect of at least one of the families comprising at least two ring tones, at least partial values of the caller's number with ring tones available from this family. This association module is capable:

- of receiving from the internal selection module identifiers of at least one of the ring tones sounded in respect of this family and at least partial values of the caller's number corresponding to said ring tones, and
 - of recording, in at least one association memory, said ring tone
- 5 identifiers and the at least partial values of the caller's number which are received by the association module and matchings between these identifiers and these values.

10 In addition, the internal selection module is designed to perform the following operations in respect of the family selected:

- of examining in the association memory if the caller's number has a value corresponding to at least one of the at least partial values recorded,
 - if the response is positive, of selecting from this family, the ring
- 15 tone corresponding to the at least partial value of the caller's number, and
- if the response is negative, of otherwise selecting one of the ring tones of this family.

20 This embodiment therefore provides the possibility of fixing a ring tone/caller's number association or a ring tone/subgroup association, within the family of ring tones in question and the corresponding group of values of the caller's number. Thus, if the user receives a call from a person linked with a given group (for example, an employee of a company) and he wishes to associate with this person, the ring tone sounded for later calls, he activates the process of person-ring tone associating. When the person calls

25 subsequently, the associated ring tone is then automatically sounded.

In this way, the user refines the associations between ring tones and persons or groups of persons, as and when calls reach him. A very flexible and adaptive system is thus available.

Advantageously, the selection means comprise a module for unequivocally assigning ring tones, which is coupled to at least one memory for unequivocally assigning ring tones. This unequivocal assignment memory is designed to contain available ring tone identifiers, complete values of the caller's number and matchings between these ring tone identifiers and these values. In addition, the unequivocal assignment module is designed:

- to examine as a matter of priority, in the unequivocal assignment memory, if the caller's number has a value corresponding to one of the complete values recorded,
- if the answer is positive, to select the ring tone corresponding to this complete value of the caller's number, and
- if the answer is negative, to be inactive.

Thus, the technique of recognizing a part of the caller's number is combined with the technique of recognizing the complete number, for a list of predetermined values of this number.

The real-time ring-tone selection device may or may not be placed in a ring tone emitter. Thus, according to one particularly advantageous embodiment, it consists of an electronic card inserted into a portable or fixed telephone, in conjunction with, for example, a memory of a removable cassette or floppy disk type, intended to contain the available ring tones. In an alternative embodiment, this device is incorporated into the ring tone emitter. The medium on which the available ring tones are stored may also be external to the emitter containing the selection device; this medium is then preferably directly accessible by a server which communicates with the emitter, for example, in the form of a memory of the server or of a disk. Such an embodiment implies, when a call is made, very rapid transfer of the ring tone from the server to the emitter. In alternative embodiments, a ring tone generator is used instead of a storage medium.

According to other embodiments, the selection device is external to the ring tone emitter and is placed in a server, advantageously in the form of software. The storage medium containing the available ring tones, or the ring tone generator, is then either placed in the emitter or is directly accessible by the server. These embodiments rely on very rapid communication between the server and the emitter, particularly when the available ring tones are external to the emitter.

In a first form of ring tones, these are with a single channel, of the type obtained by a simple buzzer. In a second form, they are multi-channel, several musical channels being provided for playing simultaneously.

The invention also relates to a device for matching available ring tones, preferably telephone ring tones, with values associated with a caller's number. This device comprises:

- means for a user to define these values, and
- means for this user to choose the available ring tones corresponding to these values.

According to the invention:

- the defining means are designed to pertain to the values of a restricted part of the caller's number defining a group of callers, and
- said selection means of choosing are capable of permitting an overall association of at least one family of at least two ring tones respectively to at least one of the values defined for the restricted part of the caller's number, independently of any link between the individual ring tones of this family and the caller's number.

The matching device of the invention is used to define groups of values of the caller's number and to choose of associated ring tones or

families of ring tones. Preferably, it is designed to be coupled with any one of the embodiments of a ring tone selection device according to the invention.

In one advantageous embodiment, the matching device is
5 incorporated into a server, preferably in software form. In other
embodiments, it is placed in a ring tone emitter. Preferably, the two
embodiments are combined, the user then having a predefined local freedom
of operation (for example, the right to modify values and associated ring
tones) and having to gain access to the server in order to carry out other
10 operations (for example to determine the digits of the caller's number which
must be taken into account in order to select the ring tones).

Advantageously, the matching device of the invention comprises
means for the user to determine the restricted part and/or portions of the
15 restricted part of the caller's number which are associated with the values
defined by the user.

Thus, the user has a great deal of freedom in associating ring
tones with the values of the caller's number and he may himself select the
20 information which seems to him to be the most useful depending on his
requirements.

According to preferred embodiments, the ring tone selection
device or the ring tone matching device comprises a musical ring tone
25 generator capable of generating the available ring tones.

Several applications involving the presence of a ring tone
generator may be distinguished:

- the ring tone generator is incorporated in the matching device;
30 the means of choosing are thus capable of offering the user a very wide
variety of ring tones, which can be renewed at will, these being composed

when the user chooses them or being generated beforehand and stored in a storage medium (memory, cassette, disk, etc.);

5 - the ring tone generator forms part of the real-time selection device and the selection means are designed to activate the ring tone generator when calls come in; advantageously, since the generation of ring tones is determined by the values of a group of parameters, some of the parameters are predefined (for example when values of the restricted part of the caller's number are being matched with ring tones) and the other parameters are left free and are specified when calls come in; this
10 embodiment requires a very short time to generate the ring tones;

 - the ring tone generator forms part of the real-time selection device and the latter is designed to generate ring tones prior to calls and to record these ring tones on a storage medium; thus, when calls come in, the ring tones are already composed; unlike the generation of ring tones by the
15 matching device, these compositions are made without any intervention by the user; however, if necessary, the selection device takes into account the choices expressed by the user during the pre-matching, for example by fixing some of the ring tone generation parameters.

20 Advantageously, the above three embodiments are combined.

 In a preferred embodiment of the musical ring tone generator, this comprises:

 - a means for defining musical moments during which at least four
25 notes are respectively capable of being played;

 - a means for defining two families of note pitches, for each musical moment, the second family of note pitches possessing at least one note pitch not in the first family of note pitches;

 - a means for constructing at least one succession of notes
30 possessing at least two notes, each succession of notes being called a musical phrase, in which succession two successive notes are necessarily

chosen from at least the first two of the following three types, independently of the order of the two notes:

- two notes whose pitches belong to the first family;
- one note whose pitch belongs to the first family and one note
5 whose pitch belongs to the second family;
- two notes whose pitches belong exclusively to the second family, the pitch of one of the two notes corresponding to a sixth degree of a diatonic scale and the pitch of the other note corresponding to a seventh degree of said diatonic scale, and these two notes being exclusively in the
10 immediate vicinity of notes whose pitch belongs to the first family; and
- a means for outputting a signal representative of each note pitch of each succession.

This musical ring tone generator is advantageously in accordance
15 with the disclosure of document WO 00/17850 (or of the corresponding European patent EP B 1 116 213 in the course of being granted). Thus, the means for constructing at least one succession of notes is preferably such that for each moment, each note whose pitch exclusively belongs to the second family is exclusively surrounded by notes of the first family.

20

By virtue of these provisions, the succession of note pitches possesses both great richness, since the several thousands of successions can be generated, and harmonic coherence, because the polyphony produced is governed by constraints.

25

According to particular features, the means for defining two families of note pitches is suitable for defining, for each musical moment, the first family as a group of note pitches belonging to a chord duplicated from octave to octave.

30

According to other particular features, the means for defining two families of note pitches is suitable for defining the second family of note

pitches for which it includes at least the note pitches of a scale which are not in the first family of note pitches.

By virtue of these provisions, it is easy to define the families and
5 the alternation between notes of the two families is harmonious.

According to other particular features, the means for constructing at least one succession of notes possessing at least two notes is suitable in that each musical phrase is defined as a group of notes, the start times of
10 which are not separated from one another, in pairs, by more than a predetermined period.

Thanks to these provisions, a musical phrase consists, for example, of notes, the start times of which are not separated by more than
15 three semiquavers.

Preferably, at least one of the means for defining musical moments, for defining two families of note pitches and for constructing at least one succession of notes is based on the value of parameters.
20 Advantageously, the parameters are then partly determined by a user when matching the ring tones with values of the restricted part of the caller's number, and partly determined subsequently for example randomly. As an illustration, the user chooses the style of music (waltz, tango, country, etc.), the duration and the tempo and the musical ring tone generator produces a
25 ring tone by randomly selecting the other parameters.

The invention also relates to a telephone apparatus. According to the invention, this comprises a ring tone selection device according to the invention and advantageously a matching device according to the invention.

The invention also relates to a datacom server. According to the invention, this server comprises a matching device according to the invention and advantageously a ring tone selection device according to the invention.

5 The invention also relates to a software product. According to the invention, this comprises functionalities capable of producing a ring tone selection device according to the invention and/or a matching device according to the invention. The expression "software product" is understood to mean any physical form of software, including not only storage media but
10 also signals.

The invention also relates to a method for selecting ring tones, preferably telephone ring tones, in real time, in which:

- a caller's number is identified,
- 15 - according to this value of the restricted part, a family of ring tones is selected from at least two families of available ring tones, at least one of these families comprising at least two ring tones, according to the values of a restricted part of the caller's number, defining a group of callers, and
- 20 - a ring tone to be sounded is selected from within the selected family.

25 According to the invention, the ring tone is selected from within this family independently of the caller's number.

Preferably, the selection method is designed to be implemented by means of a ring tone selection device according to any one of the embodiments of the invention.

30 The invention also relates to a method for matching available ring tones, preferably telephone ring tones, with values associated with a caller's number. In this method:

- a user is allowed to define these values; and
- the user is allowed to choose the available ring tones corresponding to these values.

5 According to the invention, these values relate to a restricted part of the caller's number, defining a group of callers, and the user is permitted to associate collectively at least one family of at least two ring tones with, respectively, at least one of the values defined for the restricted part of the caller's number.

10

 Preferably, the method is designed to be implemented by means of a matching device according to any one of the embodiments of the invention.

15

 The invention will be more clearly understood and illustrated by means of the following entirely nonlimiting embodiment and implementation examples, with reference to the appended figures in which:

 - figure 1 shows a telephone set incorporating a first embodiment of a real-time ring tone selection device according to the invention in
20 operation;

 - figure 2 shows in detail selection means of the ring tone selection device in figure 1 in operation;

 - figure 3 is a flowchart showing successive operations performed by the ring tone selection device in figures 1 and 2;

25

 - figures 4A and 4B show a flowchart which details ring tone selection operations of the flowchart in figure 3;

30

 - figure 5 shows schematically a datacom server incorporating a first embodiment of a matching device according to the invention and illustrates the communication between this server and the telephone set in figures 1 and 2;

- figure 6 shows a flowchart for automatic music generation, used to generate ring tones by means of the ring tone selection device in figures 1 and 2;

5 - figure 7 shows a block diagram of a musical ring tone generator which can be used in the ring tone selection device in figures 1 and 2 and allows automatic music generation according to figure 6;

10 - figure 8 shows a telephone set comprising a second embodiment of a ring tone selection device according to the invention and a datacom server comprising a second embodiment of a matching device according to the invention communicating with the telephone set;

15 - figure 9 shows schematically, in operation, a computing server which contains a third embodiment of a ring tone selection device according to the invention, similar to one of the previous embodiments, and a terminal equipped with ring tone emission means communicating with the server; and

20 - figure 10 shows a telephone set comprising both a fourth embodiment of a ring tone selection device and a third embodiment of an associated matching device, these devices being similar to those of the above embodiments.

25 The content of the figures is regarded as forming an integral part of the disclosure.

30 In the figures, identical or similar elements are denoted by the same references. In addition, the directions of the arrows generally indicate the directions of transfer of the information exchanged between several elements.

 Certain entities are denoted generically by letters and are specified by these same letters followed by indices (for example, a "ring tone S_i " is an i-th ring tone S).

A telephone 2 (figure 1), which is fixed or mobile, comprises a module 15 for communicating with a telephone network and a module 3 for emitting a ring tone S. The communication module 15 is designed in particular to receive calls coming from callers A_i , each of them having a value N_i of a caller's number 4.

The telephone 2 also comprises a storage space 5 which contains in particular a database 10 in which various ring tones are recorded. The storage space 5 is not necessarily homogeneous and it may contain, for example, a removable cassette or disk intended for the database 10 and an internal memory for the other information.

A selection device 1 included in the telephone 2 has the function of selecting an appropriate ring tone S_i from the database 10 on the basis of the value N_i of the caller's number 4. This selection relates to a restricted part of the caller's number 4. The selection device 1 essentially comprises:

- a unit 11 for identifying the caller's number 4;
- a unit 12 for selecting the appropriate ring tone S_i according to the caller's number 4 identified, which acts as an intermediary between the database 10 and the emission module 3; and
- a musical ring tone generator 13; this is designed to compose ring tones and record them in the database 10, according to instructions from the selection unit 12.

The selection unit 12 (figure 2) will now be described in detail as regards its functionalities. This unit 12 comprises, upstream of processing, a module 21 for unequivocally assigning ring tones, linked with an assigning memory 31 of the storage space 5. The assigning memory 31 contains indications which allow certain values N_i of the caller's number 4 to be associated with available ring tones in the database 10. A person using the telephone 2 thus has the possibility of recording the user's number 4 of

several preferred interlocutors (for example, ten), such as friends or members of his family, for personal use, and regular clients and suppliers and work colleagues, for professional use. Once the user has assigned a particular ring tone S to these interlocutors, on hearing said ring tone he can
5 immediately recognize if a call is coming from one of them.

The selection unit 12 also includes a module 22 for selecting a family F of ring tones and a module 23 for internally selecting a ring tone S to be sounded from within the family F selected. Two selection levels are thus
10 provided:

- the first selection level is predefined and involves the restricted part in question of the caller's number 4; each of the values of this restricted part is aimed at an entire group E_i of complete values of the caller's number 4, that is to say of callers $A_{j,k}$ ($k = 1 \dots J$); an entire family, denoted F_j , of ring
15 tones $S_{j,k'}$ ($k' = 1 \dots J'$), is associated with this group E_i ; and
- the second selection level amounts to identifying, from among the ring tones S of the F_j selected, the ring tone $S_{j,k'}$ to be sounded; the latter generally has no pre-established link with one of the callers $A_{j,k}$.

20 The first selection level relies on a tree-structure handling of the restricted part of the caller's number 4; for example, the digits of the restricted part taken into account differ according to the number of digits in the number 4 and, depending on the values of the digits taken into consideration in a first step, other digits of the restricted part may or may not
25 be involved in a second step (this procedure possibly being repeated in one or more subsequent steps).

Some of the families F of ring tones may be reduced to a single element while others may be defined by means of parameters or may be
30 based on common specificities (for example the same melody, but played by different instruments or with a different rhythm). Some of the families F may

also contain ring tones which are very different but are linked by a common theme (for example tango tunes, opera arias, children's music, etc.).

The selection of one of the ring tones S from within the family F in question is made, for example, according to one of the following methods or one of their combinations:

- random selection;
- cyclic selection, in a pre-established order repeated over the course of the cycles, or with the order of the ring tones modified at each new cycle;
- determination according to the time, for example, the week or the time of day;
- use of the complementary part of the restricted part (at least one other method is then also provided), but without the complete value of the caller's number 4 being taken into account (last digit of the caller's number, sum of all the digits of the number, etc.); either this selection criterion or the associated ring tones are not prefixed for one of the families, otherwise the restricted part of the caller's number will be implicitly meant.

However, in one particular case, the selection of a ring tone S from the family F_j uses, in a predetermined manner, a greater part of the caller's number 4 than the restricted part serving to define the families, or even the complete value of the number. This then involves associations initially made automatically by the internal selection module 23 and retained by the user for future calls. The selection unit 12 comprises for this purpose an association module 24 in conjunction with an association memory 34 of the storage space 5. This association module 24 has two functions:

- during selection by the internal selection module 23 of the ring tones S from one of the families F, to record, in the association memory 34, on request by the user, a matching between this ring tone S and an at least partial value of the caller's number 4; and

- during a subsequent call with this same at least partial value of the caller's number 4, to automatically select the corresponding ring tone S.

When the complete value of the caller's number 4 is used to
5 record the matchings, the association module 24 thus acts in an identical manner to that of the unequivocal assigning module 21 for selecting the ring tones S, since it unequivocally assigns a defined ring tone to each of the intended interlocutors. However, although the matchings in the assigning memory 31 are predetermined by the user, those in the association memory
10 34 are generated dynamically from automatic choices by the internal association module 23.

Moreover, when a partial value of the caller's number 4 is used for recording the matchings in the association memory 34, the association
15 module 24 implicitly defines one or more subfamilies of the family F in question. The selection module 1 then behaves as if the restricted part of the caller's number 4 serving to define the families was extended. However, the extension of the targeting of interlocutors is carried out dynamically on the basis of automatic choices made by the internal selection module 23, and
20 not predetermined by the user.

By default, the selection unit 12 causes a standard ring tone S to sound.

25 The execution of the operations carried out by the selection device 1 is explained below. To simplify matters, it will be assumed that the association module 24 takes the complete values of the caller's number 4 into consideration. Otherwise, when the association module 24 identifies a subfamily in the family in question, the internal selection module 11 then
30 selects one of the ring tones S from this subfamily. In operation, the procedure therefore consists of the following successive steps (figure 3):

- analysis of the caller's number 4 by the identification unit 11 (step 40);
- comparison of the complete value N_i of the number 4 with values prerecorded in the assigning memory 31, by the assigning module 21 (steps 41 and 42);
- if the complete value N_i is present in the assigning module 31, selection of the corresponding ring tone S in the database 10 (step 43);
- otherwise, application of the family selection criteria by the module 22 for selecting families F (steps 44 and 45);
- if the family selection criteria do not allow a known family to be identified, selection of the default ring tone (step 46);
- otherwise, searching for the value of the caller's number 4 in the association memory 34 (steps 47 and 48);
- if this value is present in the association memory 34, selection of the corresponding ring tone S in the database 10 (step 49);
- otherwise, application of the criteria for selecting a ring tone from within the family F in question by the internal selection module 23 (step 50); optionally, recording in the association memory 34 of the matching between the value of the caller's number 4 and the ring tone S selected, by the association module 24 and on request by the user.

An illustrative example detailing the family selection and internal selection steps (steps 44 to 50) will allow the implementation of the selection operations to be more clearly understood. This example involves selection criteria suitable for an employee of Thomson Multimedia (TMM) in France. These criteria may be supplemented or modified according to the user, in the desired manner. The internal selection techniques are not specified: they may, for example, be in accordance with any of the methods explained above. During ring tone selection (figures 4A and 4B):

- the number of digits in the caller's number 4 is examined (steps 51 and 52);

- if this is equal to 10 (a call originating from France), the first two digits of the number 4 are of interest (step 53);
- if these first two digits are 01 (a call originating from the Ile-de-France corresponding to a family F1), the next four digits are examined
5 (steps 54 and 55);
- if the latter are 4186 (indicative of TMM's Boulogne Billancourt establishment), a ring tone $S'_{1,i1}$ is selected from a subfamily F'1 of the family F1 using an internal selection technique (step 56);
- otherwise, a ring tone $S_{1,i1}$ is selected from the family F1
10 (step 61);
- if the last two digits are 02, 03, 04, 05 or 06 (values indicating a region of France from which the call comes in the case of 02, 03, 04, and 05 and of a call coming from a cellular telephone in the case of 06), a ring tone $S_{2,i2}$, $S_{3,i3}$, $S_{4,i4}$, $S_{5,i5}$ or $S_{6,i6}$ is selected from a family F2, F3, F4, F5 or F6
15 respectively (steps 62 to 66);
- if the first two digits have a value other than those above, the default ring tone S_0 is selected (step 67);
- if the number of digits is other than 10 (a call coming from a foreign country), the two first digits of the caller's number 4 are examined
20 (steps 70 and 71);
- if these digits are 00 (prefix for outside France), the third and fourth digits are examined (step 73);
- if the third digit is 1 (independently of the fourth digit: a call coming from North America, corresponding to a family F7 of ring tones), the
25 fourth to the ninth digits are examined (steps 57 and 58);
- if these digits are 609734 (indicating TMM's Princeton establishment), a ring tone $S'_{7,i7}$ is selected from a subfamily F'7 of the family F7 (step 59);
- otherwise, a ring tone $S_{7,i7}$ is selected from the family F7
30 (step 74);

- if the third and fourth digits are 49, 81 or 44 (values indicating calls coming from Germany, Japan and the United Kingdom respectively), a ring tone $S_{8,i8}$, $S_{9,i9}$ or $S_{10,i10}$ is selected from a family F8, F9 or F10 respectively (steps 75 to 77);

5 - if the third and fourth digits have a value other than those above, the default ring tone S_0 is selected (step 78); and

- if the first two digits of the caller's number 4 are other than 00 again the default ring tone S_0 is selected (step 72).

10 A datacom server 6 (figure 5) is used to predefine the criteria to be applied to the caller's number 4 and the matchings between the values of the restricted part of this number and available ring tones, said server having a matching device 80 capable of communicating with the telephone 2 via the communication network and the communication module 15.

15

The matching device 80 comprises:

- a unit 81 for determining the restricted part, or portions of this part, that is to say types of groups to which the ring tone selection criteria apply;

20

- a unit 82 for defining the values of the restricted part which are used to choose the ring tones, that is to say for determining the predetermined group for each type of group; and

- a unit 83 for choosing the available ring tones associated with the indicated values; these ring tones are, for example, produced by the generator 13 in the telephone 2 and are chosen from ring tones available in a cassette or disk commercially available for this purpose or are downloaded via the telephone network or another communication network.

25

In operation, a person using the telephone 2 is connected to the server 6, which offers him various choices relating to the caller's number 4 and the ring tones to be sounded. The user then communicates his

30

desiderata to the server 6, which in turn acts on the selection device 1 in order consequently to configure it. The units 81 to 83 are consecutively activated in a repeated manner, so that a ring-tone selection tree structure can be set up in the selection device 1.

5

One advantageous embodiment of a musical ring tone generator 13 will now be explained, with reference to figures 6 and 7. Detailed methodologies are explained in international application WO-00/17850 (or the corresponding European patent EP-B-1 116 213 in the course of being granted).

10

Figure 6 shows schematically a flowchart for automatic music generation used for the generator 13.

15

After the start 91, musical moments are defined during an operation 92. For example, a musical fragment comprising bars is then defined, each bar comprising beats and each beat comprising note positions. In this example, the operation 92 consists in assigning a number of bars to the musical fragment, a number of beats to each bar and a number of note positions to each beat or a minimum note duration. Each musical moment is defined therein in such a way that at least four notes can be played during its duration.

20

Next, during an operation 94, two families of note pitches are defined for each musical moment, the second family of note pitches possessing at least one note pitch which is not in the first family. For example, a scale and a chord, the first family comprising note pitches of this chord, which are duplicated from octave to octave, and the second family having at least the note pitches of the scale which are not in the first family, are assigned to each half-beat of the musical fragment. It is found that

25

30

various musical moments or consecutive musical moments may have the same families of note pitches.

Next, during an operation 96, at least one succession of notes
5 possessing at least two notes is constructed with, for each moment, each note whose pitch belongs exclusively to the second family being exclusively surrounded by notes of the first family. For example, a succession of notes is defined as a group of notes whose start times are not separated from each other, in pairs, by more than a predetermined period. Thus, in the example
10 mentioned with operation 94, for each half-bar, a succession of notes does not possess two consecutive note pitches which are exclusively in the second family of note pitches.

During an operation 98, a signal representative of the note pitches
15 of each succession is emitted. The music generation then stops at operation 100.

Figure 7 shows, in the form of a block diagram, one embodiment of the musical ring tone generator 13. In this embodiment, the generator 13
20 comprises, connected together by at least one signal line 110, a note pitch family generator 102, a musical moment generator 104, a musical phrase generator 106 and an output port 108. The output port 108 is connected to an external signal line 112 connected to the database 10.

25 The signal line 110 is a line capable of conveying a message or an item of information. For example, this is an electrical or optical conductor of known type. The musical moment generator 104 defines musical moments in such a way that, during each musical moment, four notes are capable of being played. For example, the musical moment generator 104 defines a
30 musical fragment by a number of bars which it contains and, for each bar, a

number of beats and, for each beat, a number of possible note start positions or a minimum note duration.

5 The note pitch family generator 102 defines two note pitch families for each musical moment. The generator 102 defines the two note pitch families in such a way that the second note pitch family possesses at least one note pitch which is not in the first family of note pitches. For example, a scale and a chord, the first family comprising the note pitches of this chord, which are duplicated from octave to octave, and the second family having at
10 least the note pitches of the scale which are not in the first family, are assigned to each half-bar of the musical fragment. It may be seen that various musical moments or consecutive musical moments may have the same families of note pitches.

15 The musical phrase generator 106 generates at least one succession of notes possessing at least two notes, each succession being constructed in such a way that, for each moment, each note whose pitch belongs exclusively to the second family is surrounded exclusively by notes of the first family. For example, a succession of notes is defined as a group
20 of notes whose start times are not separated from each other, in pairs, by more than a predetermined duration. Thus, in the example explained with the note pitch family generator 102, for each half-bar, a succession of notes does not possess two consecutive note pitches which are exclusively in the second family of note pitches.

25

 The output port 108 transmits, via the external signal line 112, a signal representative of the note pitches of each succession.

 During the configuration phase of the selection device 1 by the
30 matching device 80, musical ring tones are produced by the generator 13 according to specifications provided by the user, and the latter chooses from

among the ring tones produced those which have to be stored in the database 10.

In one embodiment, the external signal line 112 is directly
5 connected to the emission module 3, so as to generate ring tones S in real time when calls come in. During the configuration phase, the user chooses only ring-tone generation parameters and not the ring tones themselves. These parameters, which are recorded in the storage space 5, do not entirely define the ring tones, rather families of ring tones. When calls come
10 in, the appropriate parameters are then communicated to the generator 13 by the internal selection module 23.

In another embodiment, the selection device, referenced 121 and incorporated into a telephone 122 (figure 8) does not include a ring tone
15 generator. However, the matching device, referenced 120 and incorporated into a datacom server 7, includes such a generator, which may be of the type of the generator 13 described above. This delivers the ring tones to the selection module 83, according to specifications of parameters provided by the user, and these ring tones are offered to the user for recording in the
20 database 10.

One embodiment outside the field of telephony proper (figure 9) involves a terminal 8 of a computer network, such as the Internet 14, and a computing server 9. The terminal 8 is provided with ring tone emission
25 means S_i, intended to be activated when other terminals, callers A_i, request communication via the network 14. A ring tone selection device, such as, for example, that referenced 1 or 121 in the previous embodiments is placed not in the terminal 8 but in the server 9. The latter may also contain a matching device like that above, referenced 80 or 120. A subscription is allocated
30 beforehand to the terminal 8, allowing him to benefit from the services of automatic ring tone selection according to the caller.

In operation, at each call coming into the terminal 8, the latter communicates the caller's number 4 to the server 9, which determines a corresponding ring tone S_i by means of the selection device 1 or 121 and sends it to the terminal 8 in order for it to be sounded. The server 9 is preferably a local server dedicated inter alia to the terminal 8, for example, a domestic network or an internal network of a company (or else a part of this network), thereby making it possible to achieve reasonable delays between receiving the call and sounding the ring tone S_i in the terminal 8.

In another embodiment (figure 10), a telephone 132 comprises not only a ring tone selection device, such as that referenced 1 or 121 in the above examples, but also a matching device, such as that referenced 80 or 120 respectively. The telephone 132 is then also provided with a user interface 135 connected to the matching device 80 or 120, which allows the user to perform all the operations for determining the significant values of the restricted part and the ring tones to be sounded according to these values. The telephone 132 thus allows the automatic ring tone selection method to be implemented completely autonomously.

CLAIMS

1. Device (1, 121) for selecting ring tones, preferably telephone
5 ring tones, in real time, comprising:
- means (11) for identifying a caller's number (4), and
- means (12) for selecting a ring tone (S_i) to be sounded from at
least two available ring tones, which means are capable of selecting said
ring tone (S_i) to be sounded according to the value of a restricted part of said
10 caller's number (4), defining a set (E_i) of callers,
said selection means (12) comprising:
- a module (22) for selecting, according to said value of said
restricted part, a family (F_j) of ring tones from at least two families of ring
tones available, at least one of said families comprising at least two ring
15 tones,
- and an internal module (23) for selecting the ring tone ($S_{j,k}$) to be
sounded from within the family (F_j) selected,
characterized in that the internal selection module (23) is capable of
selecting said ring tone ($S_{j,k}$) to be sounded from the selected family (F_j)
20 independently of the caller's number (4).
2. Selection device (1, 121) according to claim 1, characterized in
that said restricted part is representative of an area from which the call
comes and/or a network from which the call comes.
25
3. Selection device (1, 121) according to claim 2, characterized in
that said restricted part is chosen from:
- an indicator (53) representative of a communications network;
- an indicator (73) representative of a country;
30 - an indicator (53) representative of a national region and/or a city;
- an indicator (54, 57) representative of a company network; and

- a combination of at least two of said indicators.

4. Selection device (1, 121) according to any one of the preceding claims, characterized in that the internal selection module (23) is capable of selecting said ring tone ($S_{j,k}$) to be sounded from the selected family (F_j) in a random manner.

5. Selection device (1, 121) according to any one of the preceding claims, characterized in that the internal selection module (23) is capable of selecting said ring tone ($S_{j,k}$) to be sounded from the selected family (F_j) in a cyclic manner.

6. Selection device (1, 121) according to any one of the preceding claims, characterized in that the internal selection module (23) is capable of selecting said ring tone ($S_{j,k}$) to be sounded from the selected family (F_j) according to the time.

7. Selection device (1, 121) according to any one of the preceding claims, characterized in that the internal selection module (23) is also capable of selecting said ring tone ($S_{j,k}$) to be sounded from the selected family (F_j) according to a partial complementary part of the restricted part of the caller's number (4).

8. Selection device (1, 121) according to any one of the preceding claims, characterized in that the selection means (12) comprise an association module (24) for associating, in respect of one of said families (F_j) comprising at least two ring tones, at least partial values of the caller's number (4), with ring tones ($S_{j,k}$) available from said family (F_j), said association module (24) being capable:

- of receiving from the internal selection module (23) identifiers of at least one of the ring tones ($S_{j,k}$) sounded in respect of said family (F_j) and

at least partial values of the caller's number (4) corresponding to said ring tones ($S_{j,k}$), and

- of recording, in at least one association memory (34), said ring tone identifiers and the at least partial values of the caller's number (4) which are received by the association module (24) and matchings between said identifiers and said values,

and in that the internal selection module (23) is designed to perform the following operations in respect of the family (F_j) selected:

- of examining in the association memory (34) if the caller's number (4) has a value corresponding to at least one of said at least partial values recorded,

- if the response is positive, of selecting from said family (F_j), the ring tone ($S_{j,k}$) corresponding to said at least partial value of the caller's number (4), and

- if the response is negative, of otherwise selecting one of the ring tones ($S_{j,k}$) of said family (F_j).

9. Selection device (1, 121) according to any one of the preceding claims, characterized in that the selection means (12) comprise a module (21) for unequivocally assigning ring tones, this being coupled to at least one memory (31) for unequivocally assigning ring tones, said unequivocal assignment memory (31) being designed to contain available ring tone identifiers, complete values of the caller's number (4) and matchings between said ring tone identifiers and said values, and the unequivocal assignment module (21) being designed:

- to examine as a matter of priority, in the unequivocal assignment memory (31), if the caller's number (4) has a value corresponding to one of said complete values recorded,

- if the answer is positive, to select said ring tone (S_i) corresponding to said complete value of the caller's number (4), and

- if the answer is negative, to be inactive.

10. Device (80, 120) for matching available ring tones, preferably telephone ring tones, with values associated with a caller's number (4), which device comprises:

- 5 - means (82) for a user to define these values, and
 - means (83) for said user to choose said available ring tones corresponding to said values,

characterized in that the defining means (82) are designed to pertain to the values of a restricted part of the caller's number defining a group (E_j) of
10 callers, and in that said selection means (83) are capable of permitting an overall association of at least one family (F_j) of at least two ring tones ($S_{j,k}$) respectively to at least one of said values defined for the restricted part of the caller's number (4), independently of any link between the individual ring tones of said family and the caller's number (4),

15 said matching device (80, 120) being preferably designed to be coupled to a ring tone selection device (1, 121) according to any one of claims 1 to 9.

11. Matching device (80, 120) according to claim 10, characteri-
20 zed in that it comprises means (81) for said user to determine said restricted part and/or portions of said restricted part of the caller's number (4) which are associated with said values.

12. Selection device (1) according to any one of claims 1 to 9, or
25 matching device (120) according to either of claims 10 and 11, characterized in that it comprises a musical ring tone generator (13) capable of generating said available ring tones.

13. Device (1, 120) according to claim 12, characterized in that the
30 musical ring tone generator (13) comprises:

- a means (104) for defining musical moments during which at

least four notes are respectively capable of being played;

- a means (102) for defining two families of note pitches, for each musical moment, the second family of note pitches possessing at least one note pitch not in the first family of note pitches;

5 - a means (106) for constructing at least one succession of notes possessing at least two notes, each succession of notes being called a musical phrase, in which succession two successive notes are necessarily chosen from at least the first two of the following three types, independently of the order of the two notes:

10 - two notes whose pitches belong to the first family;
 - one note whose pitch belongs to the first family and one note whose pitch belongs to the second family;

 - two notes whose pitches belong exclusively to the second family, the pitch of one of the two notes corresponding to a sixth degree of a
15 diatonic scale and the pitch of the other note corresponding to a seventh degree of said diatonic scale, and said two notes being exclusively in the immediate vicinity of notes whose pitch belongs to the first family; and

 - a means (108) for outputting a signal representative of each note pitch of each said succession.

20

14. Device (1, 120) according to claim 13, characterized in that the means (102) for defining two families of note pitches is suitable for defining, for each musical moment, the first family as a group of note pitches belonging to a chord duplicated from octave to octave.

25

15. Device (1, 120) according to claim 14, characterized in that the means (102) for defining two families of note pitches is suitable for defining the second family of note pitches for which it includes at least the note pitches of a scale which are not in the first family of note pitches.

30

16. Device (1, 120) according to any one of claims 13 to 15, characterized in that the means (106) for constructing at least one succession of notes possessing at least two notes is suitable in that each musical phrase is defined as a group of notes, the start times of which are
5 not separated from one another, in pairs, by more than a predetermined period.

17. Telephone apparatus (2, 122, 132) characterized in that it comprises a ring tone selection device (1, 121) according to any one of
10 claims 1 to 9 and 12 to 16 and advantageously a matching device (80, 120) according to any one of claims 10 to 16.

18. Datacom server (6, 7) characterized in that it comprises a matching device (80, 120) according to any one of claims 10 to 16, and
15 advantageously a ring tone selection device (1, 121) according to any one of claims 1 to 9 and 12 to 16.

19. Software product characterized in that it comprises functionalities capable of producing a ring tone selection device (1, 121)
20 according to any one of claims 1 to 9, and 12 to 16 and/or a matching device (80, 120) according to any one of claims 10 to 16.

20. Method for selecting ring tones, preferably telephone ring tones, in real time, in which:
25 - a caller's number (4) is identified,
- according to said value of said restricted part, a family (F_j) of ring tones is selected from at least two families of available ring tones, at least one of said families comprising at least two ring tones, according to the values of a restricted part of said caller's number (4), defining a group (E_j) of
30 callers, and

- a ring tone ($S_{j,k}$) to be sounded is selected from within the selected family (F_j),

characterized in that said ring tone ($S_{j,k}$) is selected from within said family (F_j) independently of the caller's number (4),

- 5 said selection method being preferably designed to be implemented by means of a ring tone selection device (1, 121) according to any one of claims 1 to 9 and 12 to 16.

21. Method for matching available ring tones, preferably telephone
10 ring tones, with values associated with a caller's number (4), in which:

- a user is allowed to define said values; and
- the user is allowed to choose the available ring tones corresponding to said values;

- characterized in that said values relate to a restricted part of said caller's
15 number (4), defining a group (E_j) of callers, and in that the user is permitted to associate collectively at least one family (F_j) of at least two ring tones ($S_{j,k}$) with, respectively, at least one of said values defined for the restricted part of said caller's number (4), independently of any link between the individual ring tones of said family and the caller's number (4),

- 20 said method being preferably designed to be implemented by means of a matching device (80, 120) according to any one of claims 10 to 16.

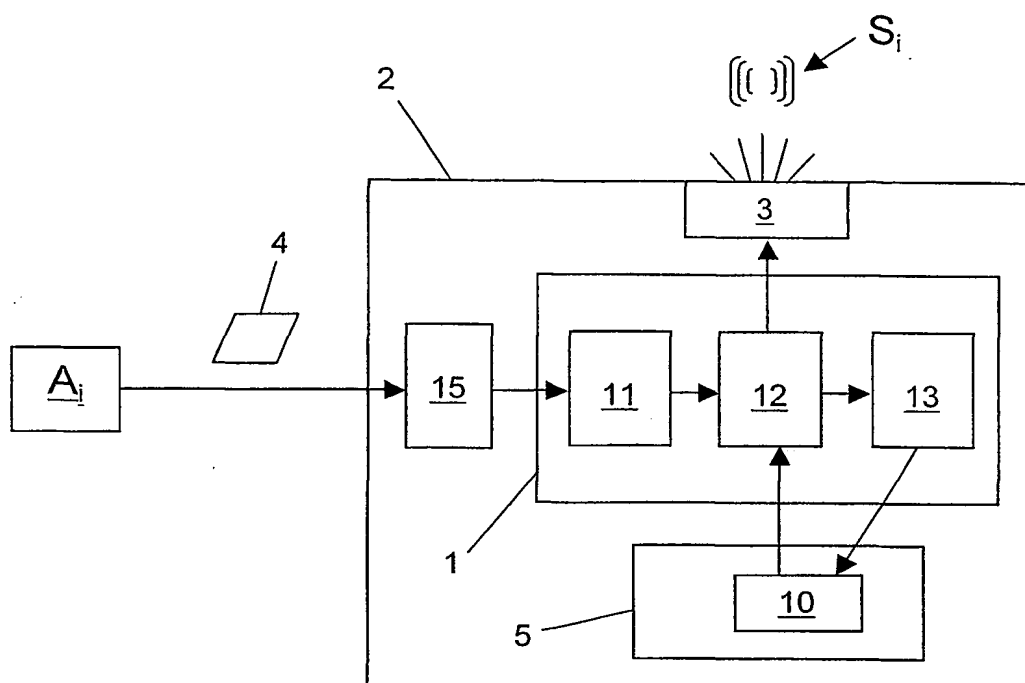


FIG. 1

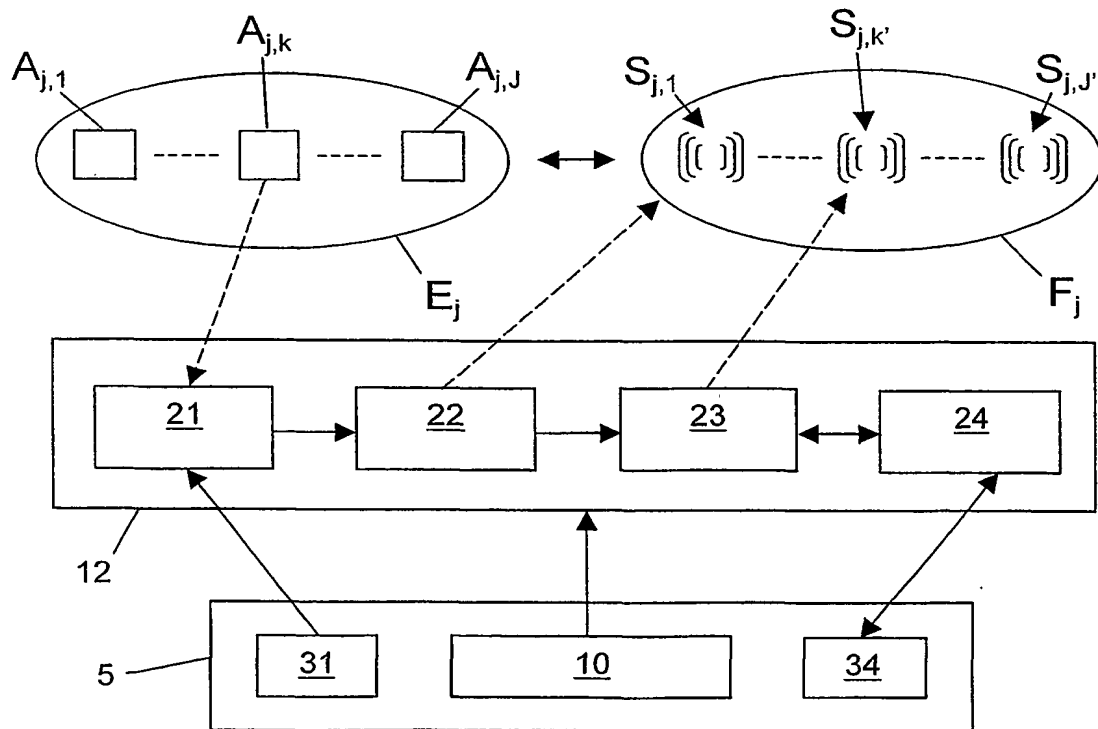


FIG. 2

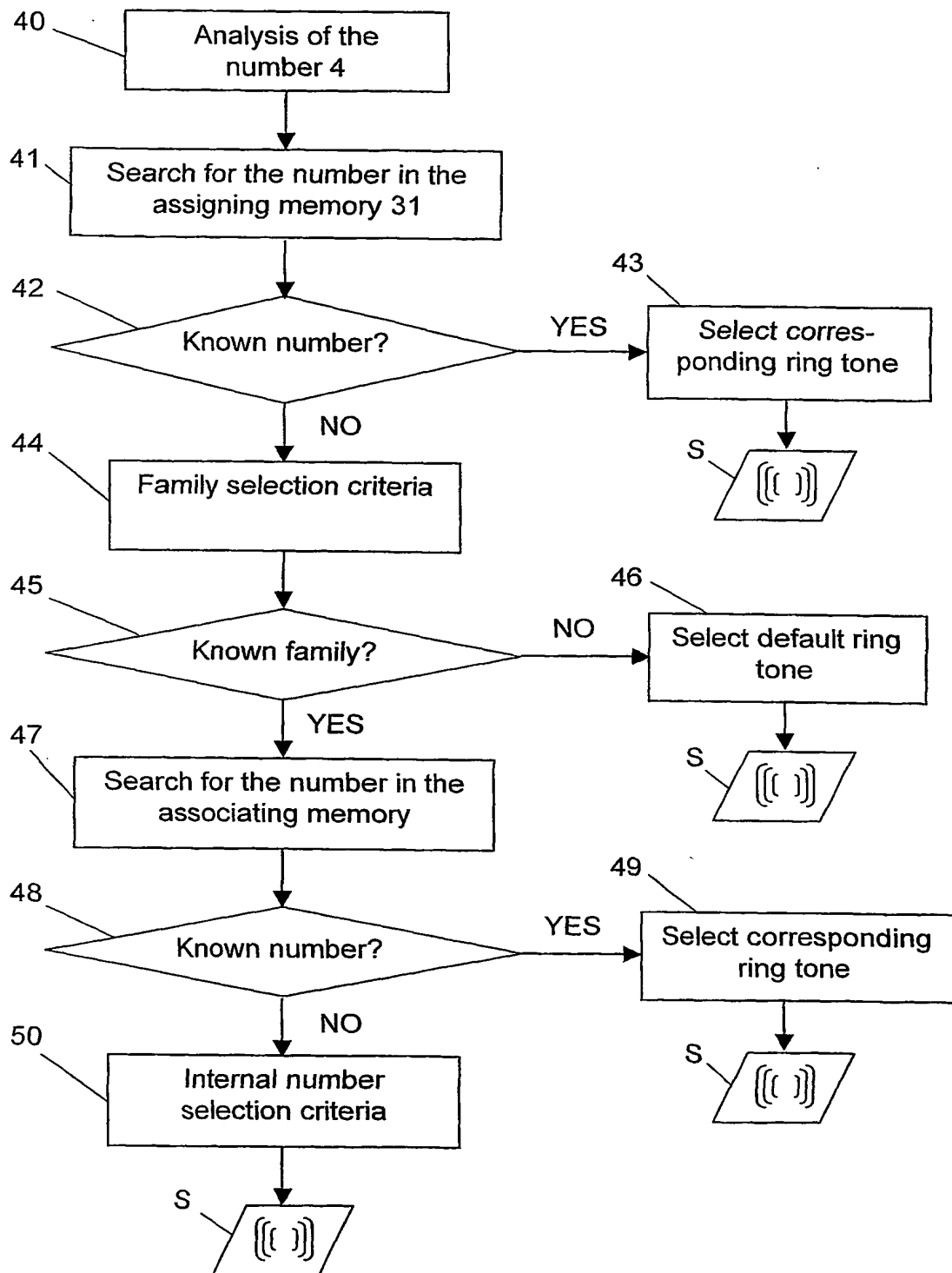


FIG. 3

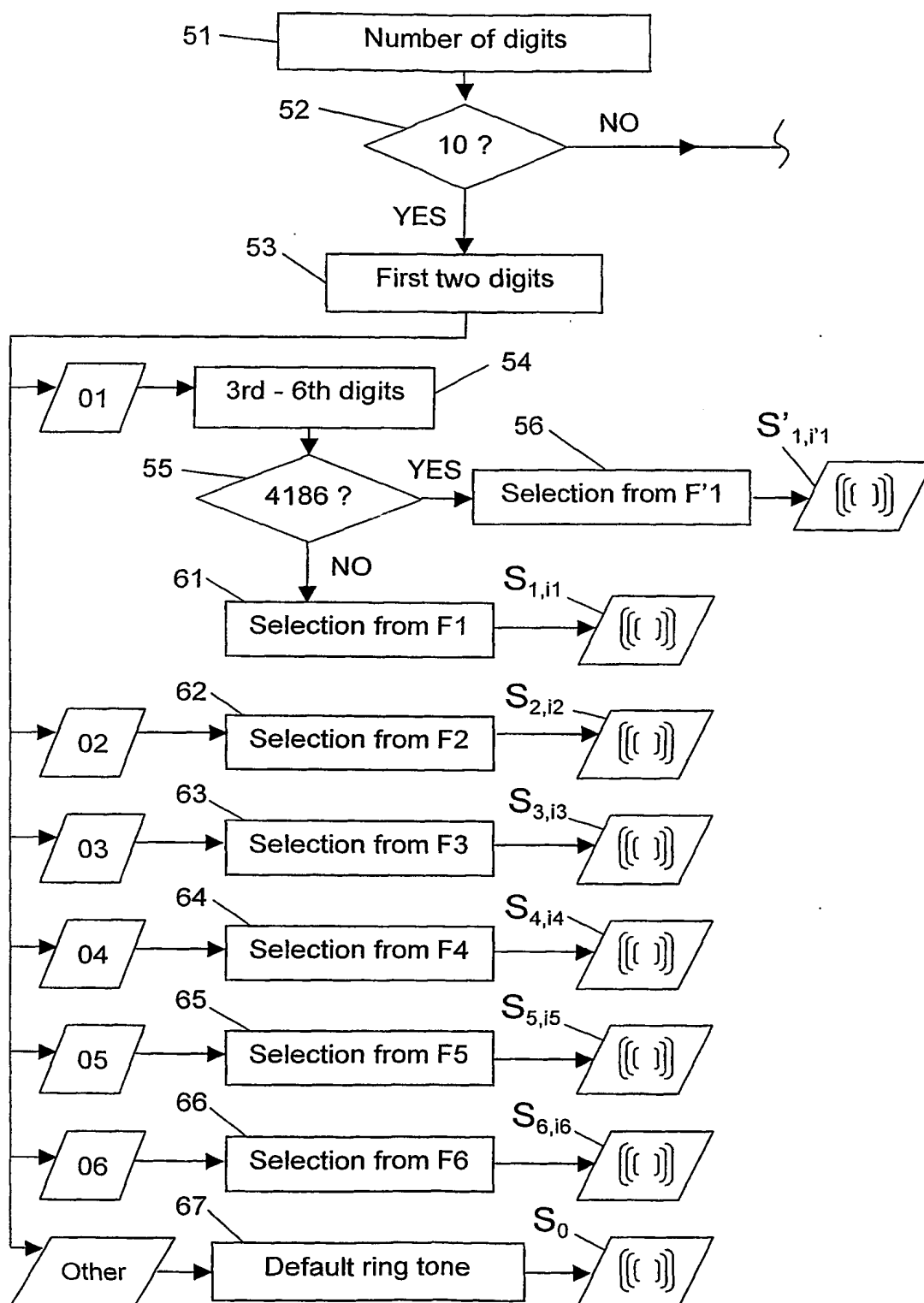


FIG. 4A

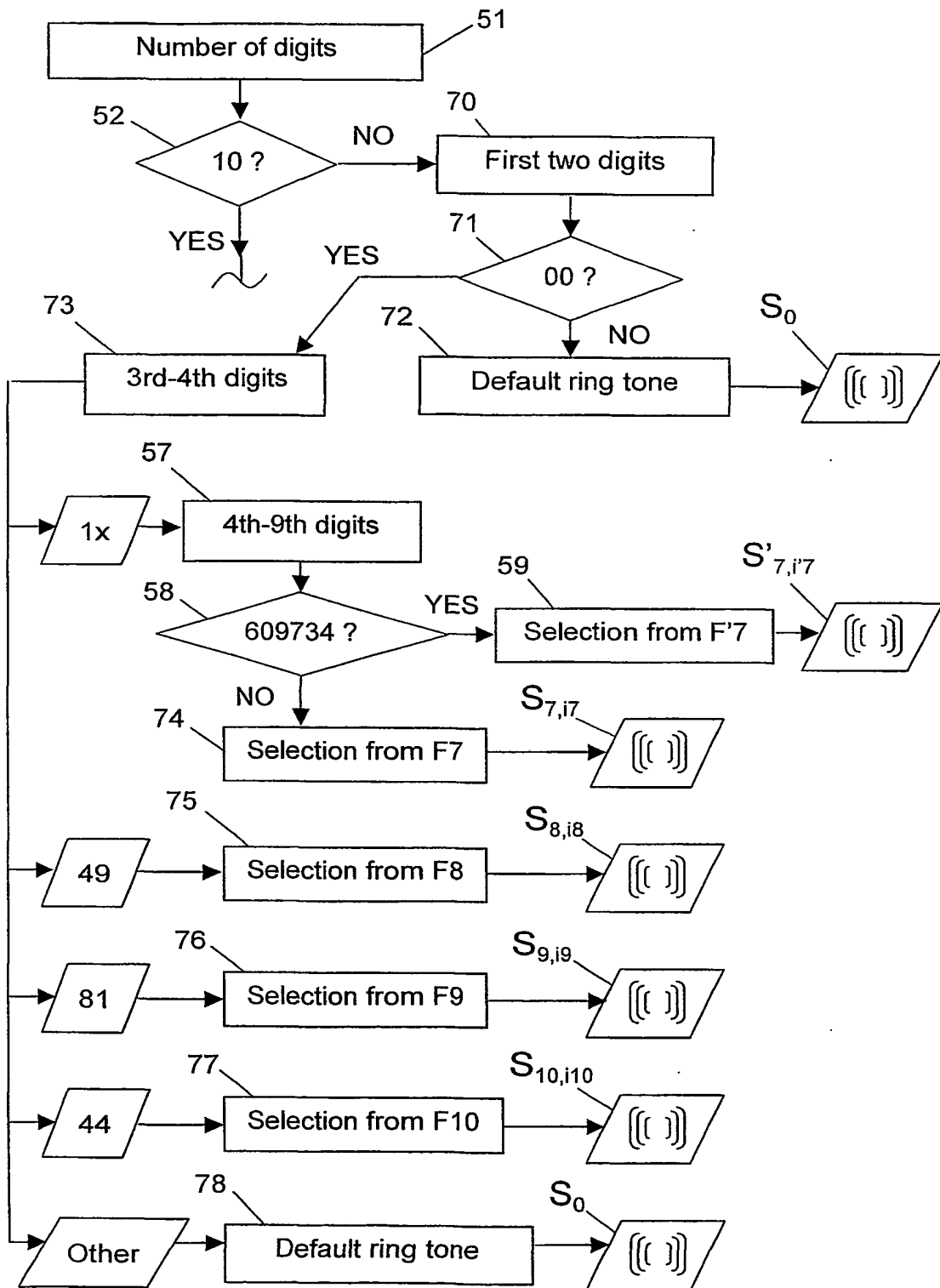


FIG. 4B

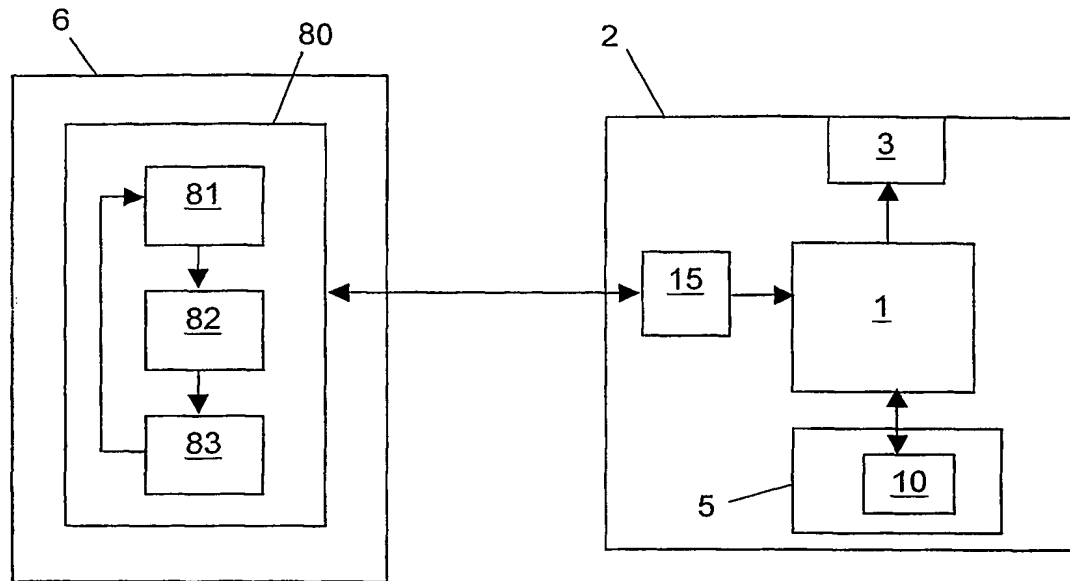


FIG. 5

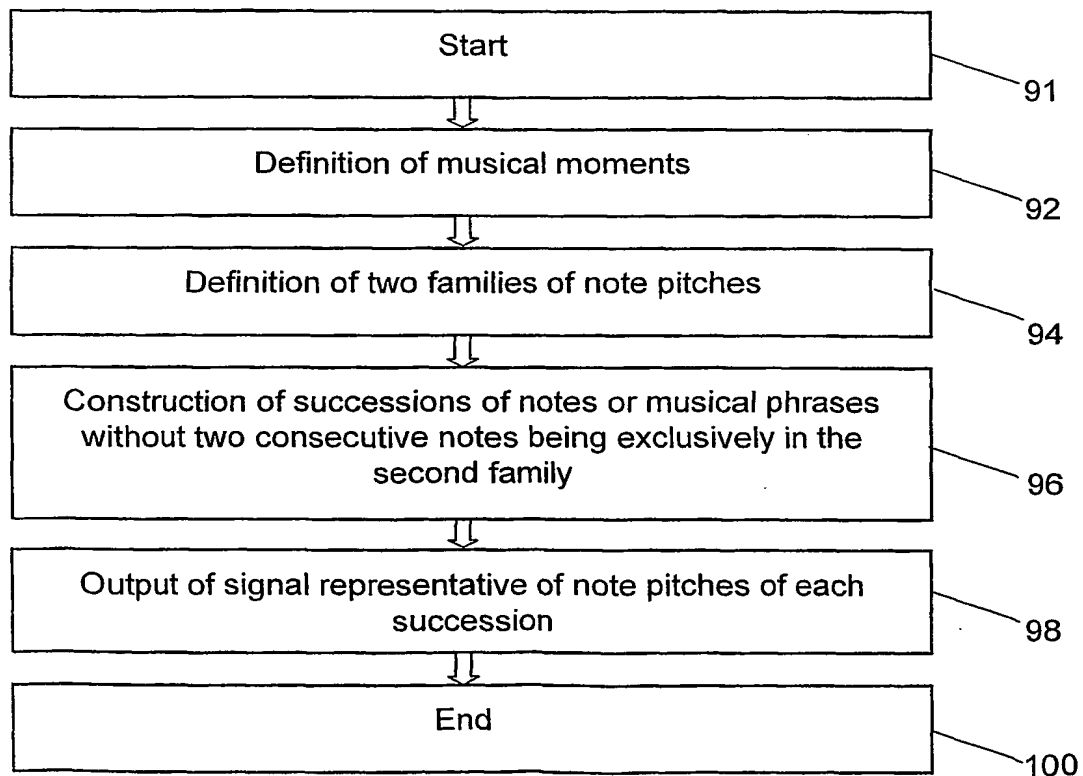


FIG. 6

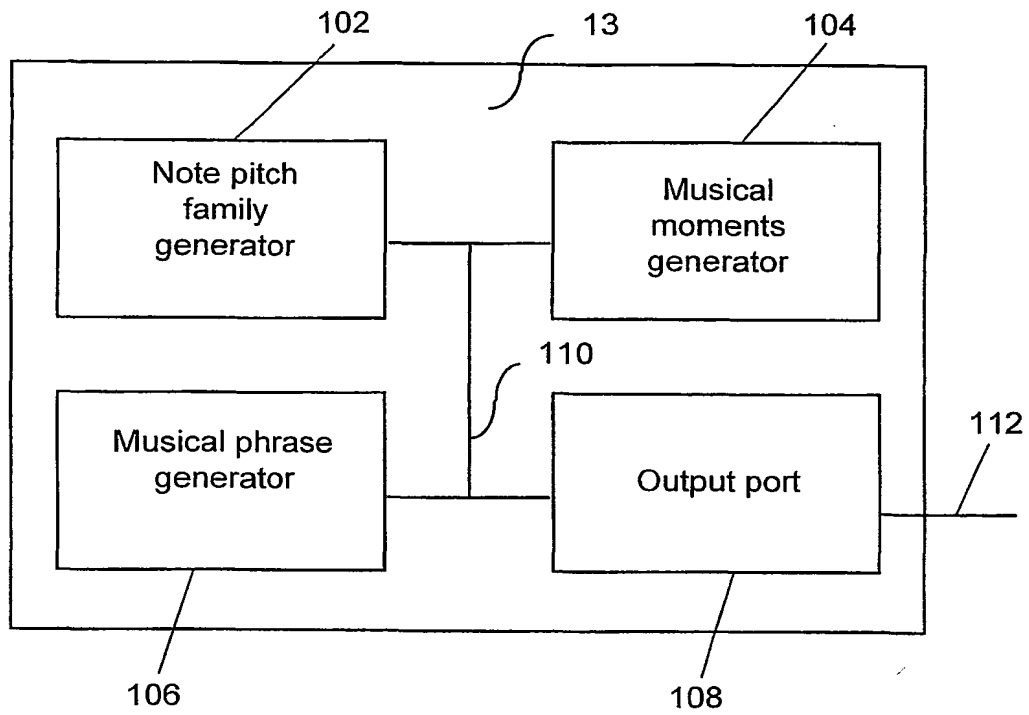


FIG. 7

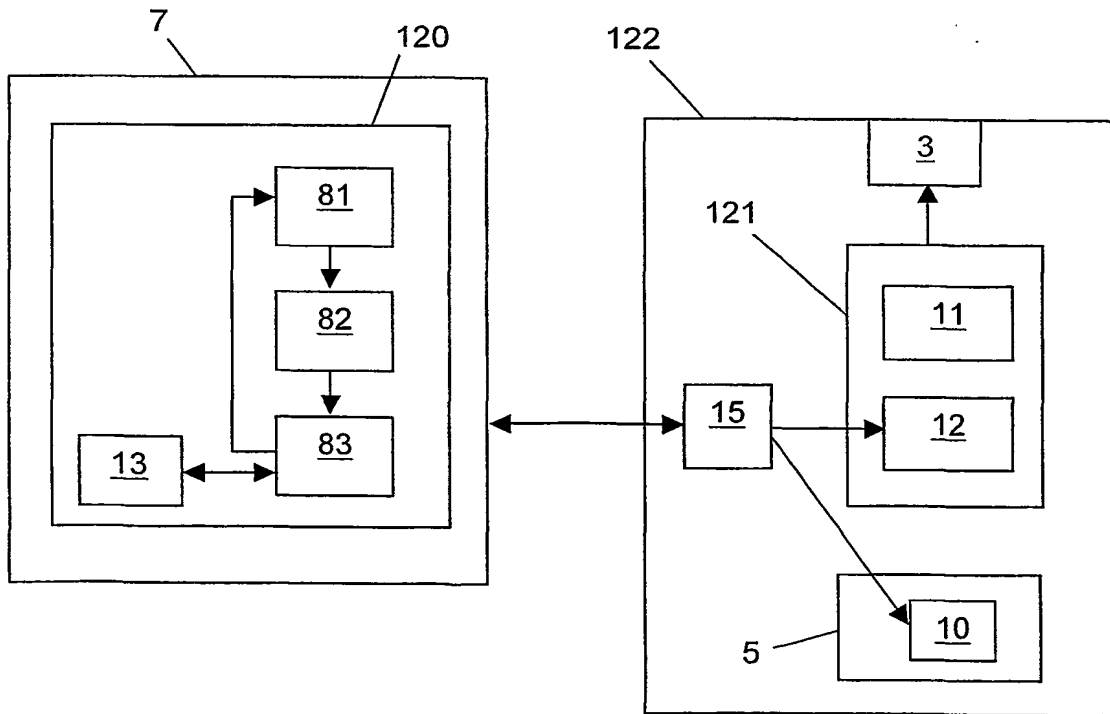


FIG. 8

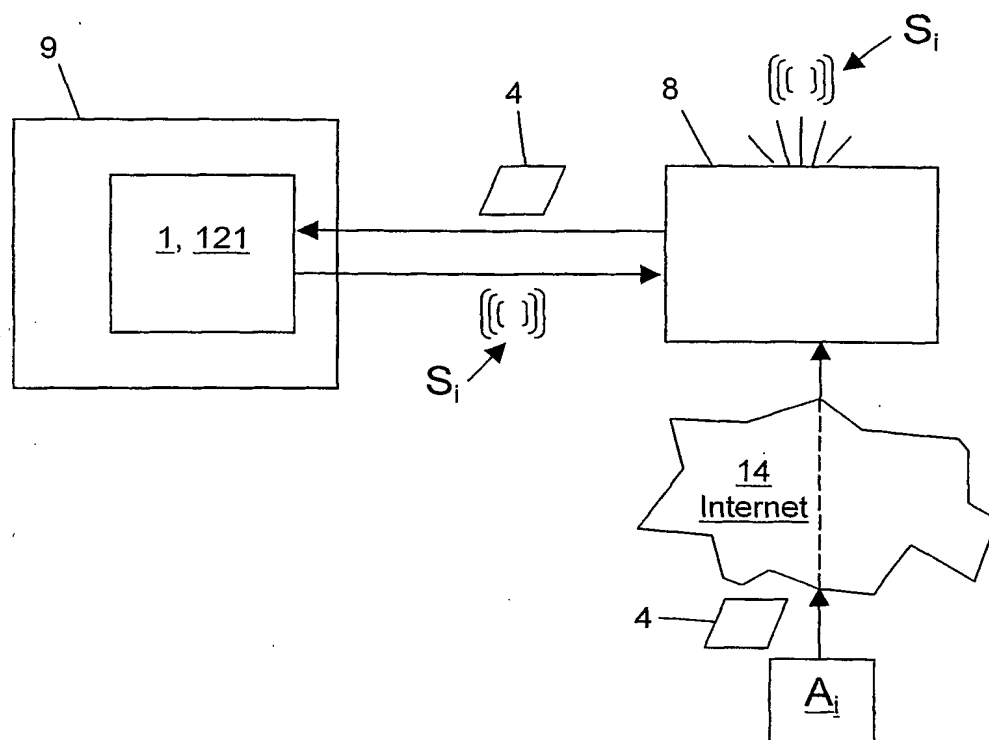


FIG. 9

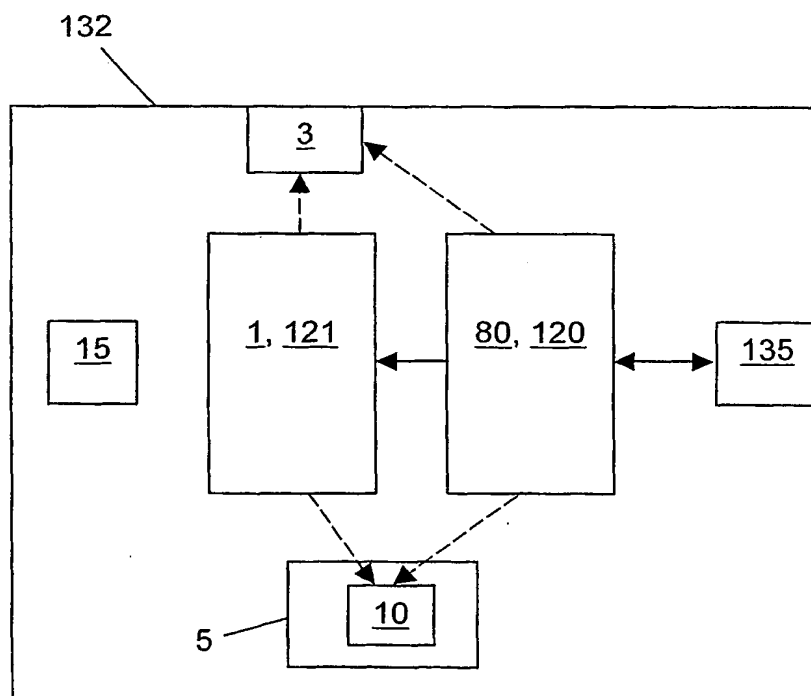


FIG. 10

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(72) Inventors; and

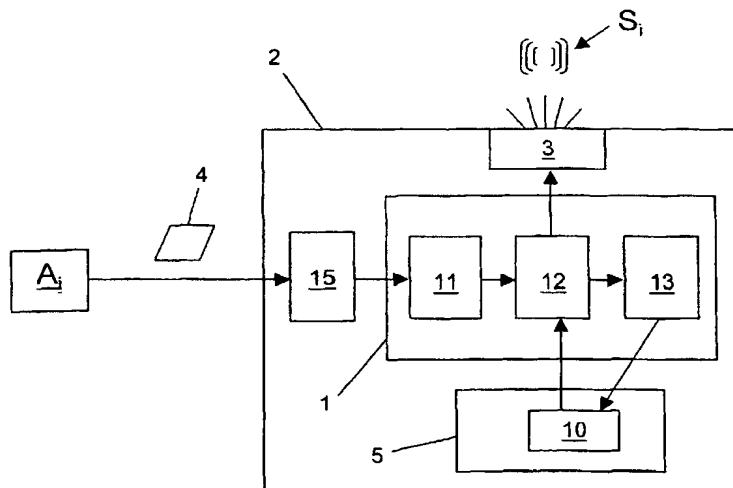
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Declaration under Rule 4.17:

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US

[Continued on next page]

(54) Title: DEVICE FOR SELECTING RING TONES IN REAL TIME ACCORDING TO THE CALLER'S NUMBER AND ASSOCIATED METHODS AND SYSTEMS



(57) Abstract: The present invention relates to devices and methods for selecting ring tones in real time and for matching available ring tones with values associated with a caller's number. The selection device (1) comprises means (11) for identifying a caller's number (4) and means (12) for selecting a ring tone (S_i) to be sounded from available ring tones. These selection means select the ring tone to be sounded according to the value of a restricted part of the caller's number, preferably representative of an area and/or a network from which the call comes. They comprise a module for selecting, according this value, a family of ring tones and a module for internally selecting the ring tone to be sounded from within the selected family, independently of the caller's number.



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INTERNATIONAL SEARCH REPORT

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 901 263 A (NOKIA MOBILE PHONES LTD) 10 March 1999 (1999-03-10) cited in the application the whole document ----	1-21
A	GB 2 308 038 A (NOKIA MOBILE PHONES LTD) 11 June 1997 (1997-06-11) cited in the application abstract ----	1-21
A	US 5 696 817 A (YATSU HIROYUKI) 9 December 1997 (1997-12-09) column 2, line 41 - line 47 ----	1-21
A	WO 98 30005 A (ERICSSON GE MOBILE INC) 9 July 1998 (1998-07-09) abstract -----	1-21

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Information on patent family members

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